National Synchrotron Light Source

Building 743, National Synchrotron Light Source
Brookhaven National Laboratory
Upton, NY 11973-5000
Phone 631 344-2117
Fax 631 344-3238
zhong@bnl.gov

managed by Brookhaven Science Associates
for the U.S. Department of Energy

Memo

Date: November 15, 2018
To: Conan Weiland, Cherno Jaye, Dan Fischer, Andrew Broadbent, and Paul Zschack
From: Zhong Zhong (chair), Photon Science Radiation Safety Committee
Subject: Review of the radiation safety aspects of the LARIAT-2 endstation at SST

Dear Conan, Cherno, Dan, Andy, and Paul

The Photon Science Radiation Safety Committee (RSC) met with the LARIAT-2 team on Nov. 6 to review the radiation safety of the LARIAT-2 (Large Area Rapid Image Analysis Tool MK-II), currently located at the end of SST-1 beamline. Subjects reviewed include synchrotron radiation shielding impacts, and configuration control of the beamstop.

Presentation

Conan led the discussion by presenting the features of LARIAT-2. Following the guideline from the memo by Paul Zschack to the RSC on May 29, 2014, the following were discussed:

1. LARIAT-2, a re-purposed endstation from NSLS U8B, has been installed at the SST-1 beamline. Currently a shutter (#9) upstream of it prevents synchrotron monochromatic beam from entering the chamber.
2. The endstation receives soft, monochromatic x-ray beam with energies from 150 to 2200 eV. Ray tracing of the SST beamline, reviewed by the RSC before, shows that it is not possible for the endstation at the end of SST1 to receive white or pink beam.
3. From Tech Note #275 (S. Chitra), stainless steel of 1 mm thickness, at normal incidence, is sufficient to stop the SST1 monochromatic beam. Sunil's simulation considers contributions from all possible harmonics. The thicknesses of both the chamber sidewall (3 mm stainless steel) and the beam entrance port tubing (1.5 mm stainless steel) are thus sufficient to act as the beamstop for the SST1 beamline.
4. The design of the chamber assures that minimum wall thickness is 1.5 mm stainless steel. This is sufficient for shielding against scattered radiation.
5. Redundant vacuum switches are integrated into PPS system to prevent x-ray beam from entering the chamber when it is vented.
6. Configuration control of the beamstop was discussed.

Times they are a changin, but one thing stays the same: Peet's coffee was duly served.

Notes

1. We note that a radiation survey is needed around the LARIAT-2 chamber. Since the risk of radiation exposure is extremely low, the commissioning survey of the chamber can be performed at normal ring current.
2. Configuration control sticker on the chamber, as well as the updated radiation safety component checklist, have been reviewed by the RSC checklist sub-committee.

Recommendations

The RSC has no recommendations at this time.

Radiation Safety Committee

Name	*Expertise*	*Directorate*
Andrew Ackerman	Deputy ESH Manager	PS
Andi Barbour	Beam Line Physicist	PS
Mohamed Benmerrouche	Nuclear and Radiation Physics	PS
Scott Buda	Personnel Protective Systems	PS
Ray Fliller	Accelerator Physicist	PS
Wah-Keat Lee	Beam Line Physicist	PS
Boris Podobedov	Accelerator Physics	PS
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Lutz Wiegart	Beam Line Physicist	PS
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Andrew Ackerman	Deputy ESH Manager	PS
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RSC checklist sub-committee

Andi Barbour	Beam Line Physicist	PS
Mohamed Benmerrouche	Nuclear and Radiation Physics	PS
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